

U.S. Application No. 10/814,713
Response dated April 9, 2009 to
Non-final Office Action dated January 9, 2009

REMARKS

In the non-final Office Action dated January 9, 2009, Examiner has rejected claims 1-10, 13-15, 17-19, 21, 35-29, and 41 under 35 U.S.C. §103(a) as being unpatentable over Xia et al. U.S. Patent No. 6,426,015 (hereafter “Xia”). Claims 11-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Xia in view of Law et al. U.S. Patent No. 6,338,874 (hereafter “Law”). Claims 16, 22, 28, and 40 are rejected under 35 U.S.C. §103(a) as being unpatentable over Xia in view of Discenzo U.S. Patent No. 6,950,193 (hereafter “Discenzo”). Claims 26-27, and 32-33 are rejected under 35 U.S.C. §103(a) as being unpatentable over Xia in view of Discenzo and further in view of Furuhashi et al. U.S. Patent Application Publication No. 2004/0132257 (hereafter “Furuhashi”). The following remarks are respectfully submitted.

Regarding the rejection of claims 1-10, 13-15, 17-19, 21, 35-29, and 41 as being obvious over Xia, Applicants respectfully traverse. Claim 1 recites, in part:

performing a first manufacturing process on the one or more first substrates ...
whereby a first film deposit is formed on a chamber component ...; removing the one or more first substrates ...; exposing the chamber component ... to a reactant gas to form a particle-reducing film, wherein the particle-reducing film is: an oxide or oxynitride film formed on the first film deposit residing on the chamber component, or a nitride, oxide or oxynitride film formed from at least a portion of the first film deposit residing on the chamber component

Examiner cites to Col. 2, lines 20-26 of Xia, where it is disclosed that, before depositing an insulation layer on a substrate, the chamber is cleaned of residues left over from a previous processing step, and cites to lines 50-63, where it is disclosed that the insulation layer is applied to a substrate in a “seasoned” chamber “by a closely similar process using materials, times, and conditions such as utilized in the previous chamber ‘seasoning’ treatment.” However, Examiner conveniently omits the disclosure therebetween in lines 27-34, where it is stated that “a clean reaction chamber, before a semiconductor wafer is placed into it, is “seasoned”, or pre-conditioned by a step of introducing into the chamber the same general kind of insulating compound ... as also applied later to semiconductors on a wafer, and under similar conditions of

times, temperatures pressures and concentrations.” In other words, before the seasoning treatment (i.e., before depositing a particle-reducing film), the chamber is cleaned to remove any residues (i.e., first film deposit) on the chamber components from a previous manufacturing step. That being the case, it is not taught or suggested that the particle-reducing film of the invention is formed on the first film deposit residing on the chamber component, or formed from at least a portion of the first film deposit residing on the chamber component since the first film deposit is first removed in a cleaning step to provide a clean reaction chamber. Moreover, Xia’s method does nothing toward the goal of decreasing the frequency of chamber cleaning processes for a process chamber of a processing system, since the chamber must be cleaned before each seasoning step. Thus, there is no teaching or suggestion that the particle-reducing film (an oxide or oxynitride) is formed on the first film deposit formed on the chamber component in a first manufacturing process or that the particle-reducing film (a nitride, oxide or oxynitride) is formed from at least a portion of the first film deposit formed on the chamber component in the first manufacturing process, as recited in claim 1. For at least this reason, Examiner has failed to establish a *prima facie* case of obviousness against claim 1 and its dependent claims 2-10, 13-15, 17-19, and 21. It is therefore respectfully requested that the rejection be withdrawn.

Claim 35 recites, in part:

performing a first manufacturing process on ... first substrates ... at the first temperature whereby a first film deposit is formed on the chamber component ... ; removing the ... first substrates ...; elevating the temperature of the chamber component ... to a second temperature greater than the first temperature; exposing the first film deposit ... to a reactant gas at the second temperature ... to chemically modify at least a portion of the first film deposit to thereby form a ... particle-reducing film on the chamber component; lowering the chamber component ... to the first temperature; performing a second manufacturing process on ... second substrates ... at the first temperature whereby a new film deposit is formed on the particle-reducing film

As discussed above with reference to claim 1, Xia removes any residues on the chamber components from a first manufacturing step prior to performing the seasoning step. Thus, Xia does not teach or suggest chemically modifying at least a portion of the first film deposit to

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thereby form the particle-reducing film, as recited in claim 35. In addition, Examiner asserts that Xia teaches in col. 2, lines 36-63 to vary the temperature and other parameters. In that passage, Xia discloses parameters for the seasoning step and that the subsequent manufacturing step can be carried out “by a closely similar process using materials, times, and conditions such as utilized in the previous chamber ‘seasoning’ treatment.” There is absolutely no teaching or suggestion that the first and second manufacturing processes are performed at a first temperature, and that the intervening step of forming the particle-reducing film by chemically modifying the first film deposit is performed at a second temperature that is higher than the first temperature. To the contrary, Xia teaches maintaining similar conditions from one step to the next. In that regard, it is noted that the manufacturing steps and seasoning steps are simple deposition steps, and of the same materials, such that maintaining the same deposition parameters would be considered optimal. However, Xia does not teach or suggest anything as to the optimal parameters where the intervening step is a chemical modification of a material deposit as in the claimed invention rather than deposition of a material as in Xia. Therefore, it does not follow that it would have been obvious from Xia to vary the parameters including temperature with the expectation of obtaining optimum temperatures for a chemical modification step between two deposition steps (as opposed to varying temperature to obtain an optimum deposition temperature for 3 deposition steps of the same material). For at least these reasons, Examiner has failed to establish a *prima facie* case of obviousness against claim 35 and its dependent claims 36-39, and 41. It is therefore respectfully requested that the rejection be withdrawn.

The comments above for claim 35 regarding temperature variations apply equally to claims 9-15. For at least that additional reason, Examiner has failed to establish a *prima facie* case of obviousness against claims 9-15. It is therefore respectfully requested that the rejection be withdrawn.

With respect to the rejections over Xia in view of Law, Discenzo and/or Furuhashi, the secondary references do nothing to cure the deficiencies of Xia set forth above. Specifically, Law, Discenzo and Furuhashi do not teach or suggest exposing a first film deposit

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to a reactant gas to form a particle-reducing film on or from the first film deposit, as recited, nor do they teach or suggest the temperature variation between the manufacturing (deposition) steps and the intervening step of forming the particle reducing film. Thus, there is no *prima facie* case of obviousness under § 103 over Xia in view of Law, Discenzo and/or Furuhashi. Applicants thus respectfully request that the rejections of claims 11-12 over Xia in view of Law, claims 16, 22, 28 and 40 over Xia in view of Discenzo, and claims 26-27 and 32-33 over Xia in view of Discenzo and further in view of Furuhashi be withdrawn.

In view of the remarks given herein, Applicants respectfully believe this case is in condition for allowance and respectfully request allowance of the pending claims. If the Examiner believes any detailed language of the claims requires further discussion, the Examiner is respectfully asked to telephone the undersigned attorney so that the matter may be promptly resolved. The Examiner's prompt attention to this matter is appreciated.

Applicants are of the opinion that no fee is due as a result of this Response. If any additional charges or credits are necessary to complete this communication, please apply them to Deposit Account No. 23-3000.

Respectfully submitted,

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